COAL MINING

JANUARY, 1953

published by Modern Mining Publishing Co.
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VOLUME 30, No. 1

Allis-Chalmers motor scrapers at R. C. Carlin mine near Snow Shoe.

Allis-Chalmers scraper speeds up stripping at Michigan Limestone Co. job near New Castle.

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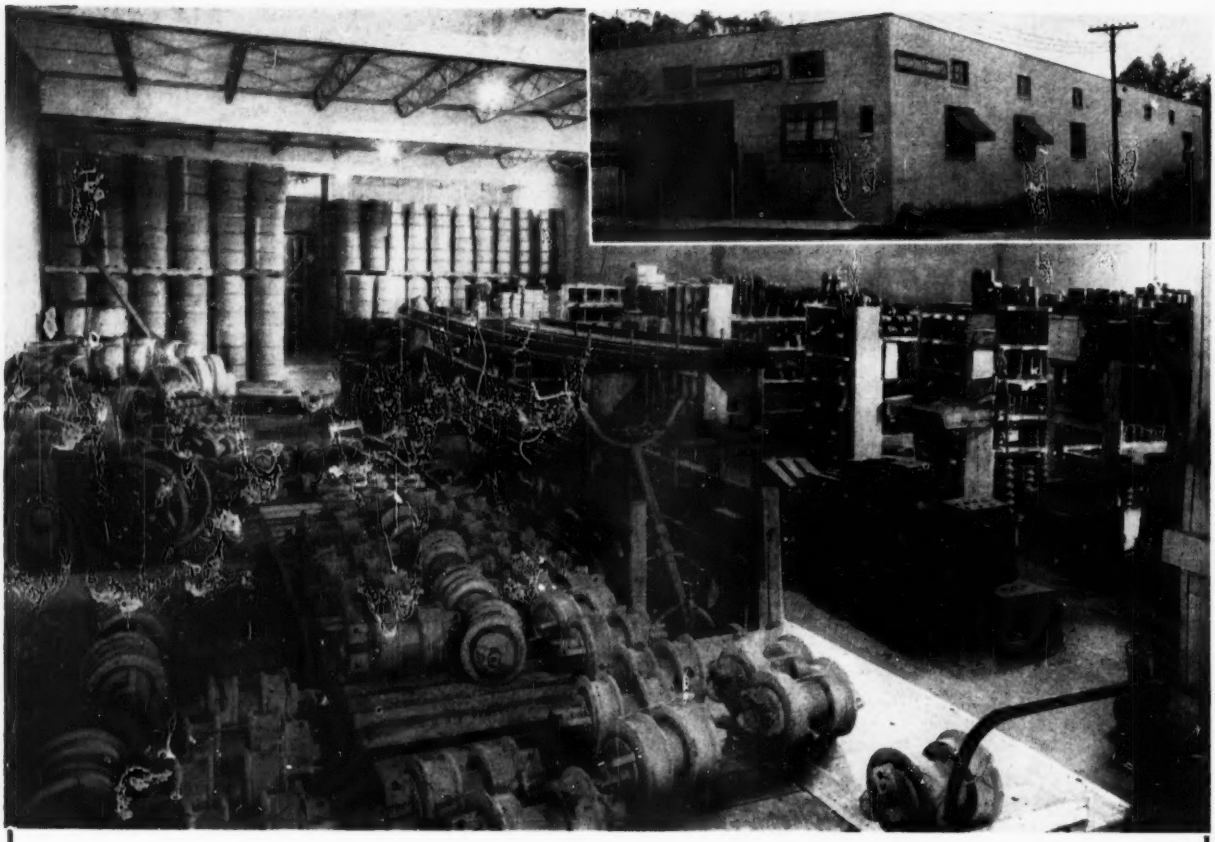

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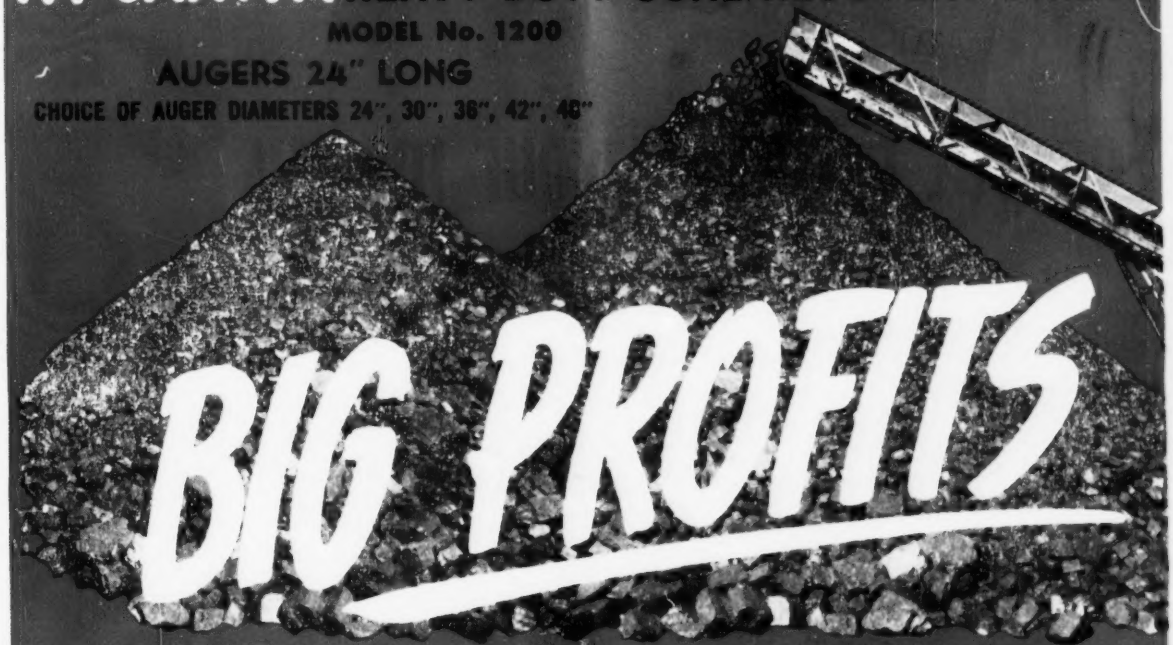
AUGERS 24" LONG

CHOICE OF AUGER DIAMETERS 24", 30", 36", 42", 48"



BIG PROFITS

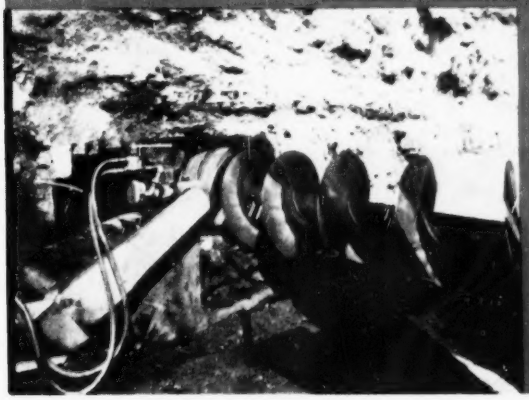
Small Investment—Low Overhead . . .

● You trade rich coal deposits in unmined, abandoned, high-wall strip mines for money in the bank when you put the new McCarthy auger machine to work.

You gain many thousands of tons of coal in the course of a year because the McCarthy machine is designed for quick, easy transportation from one hole to the next—and no bulldozer is required to move it. The new McCarthy auger machine is *self-propelling.*

With an output of about 40 tons an hour for this 36" diameter McCarthy auger drill, a three-man crew, low maintenance and low amortization costs from smaller initial investment, the profit per ton is top dollar.

▲ Conveyor extension under auger cleanly picks up augered coal, and boosts it to 35-foot truck loading conveyor. For ease in portability of all equipment from one strip mine to the next, conveyors are detached from auger machines.



◀ Conveyors can be operated from either side of the McCarthy new coal recovery drills. Cutting speeds average up to 3 feet per minute.

THE SALEM TOOL CO.

763 S. ELLSWORTH AVE. · SALEM, OHIO, U. S. A.

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"Caterpillar" Diesel installation!

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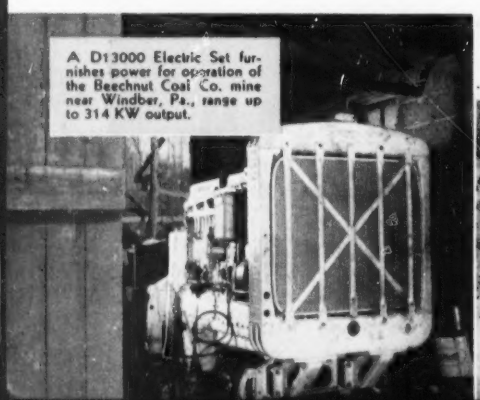
• With a Beckwith Machinery Co. "Cat" Diesel Engine installation, you get many extras . . . many advantages that no other power source can give you!

You get an engine that, for 21 years, has never failed to lower operating costs wherever it works . . . an engine that users swear by, not at, for long years of trouble-free service . . . an engine that sticks to the job in any weather and meets every load with ample power.

You get expert engineering assistance by Beckwith Machinery Co.'s staff of trained engine men — men who can tell the exact engine to do your job . . . can install it properly and economically.

You get the backing of Beckwith's modern repair and parts service—service that's always ready to go . . . always knows how to get and keep your "Cat" Engines in top profit-producing shape.

If your power is growing old or your production slipping, call Beckwith for an estimate on a "Cat" Diesel Engine installation. There's no obligation!



A D13000 Electric Set furnishes power for operation of the Beechnut Coal Co. mine near Windber, Pa., range up to 314 KW output.

A ditcher, owned by George Shushereba, Turtle Creek, Pa., is powered by a "Cat" D4600 veteran of thousands of hours. 75,000 to 90,000 hours are common with "Cat" Diesels.

A wide selection of bases, clutches, cooling systems and equipment fits "Cat" Diesels for any power need. Here, a D315, powers a pump on R. C. Murphy & Co. operations near Huey.

Shovels, cranes and draglines show a remarkable ability to produce more and steadily with "Cat" power. Old machines can be repowered or new machines equipped with "Cat" Diesels. This stripping shovel of Mays Coal Co., Clarion, Pa., is powered by the 400 HP "Caterpillar" D386 Engine shown.

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240 tons hourly at Red Parrot Mine

Tournarocker is chute-loaded with 15 tons of slate and bone coal in 18 seconds. Rig was driven to Prenter from Charleston (35 miles) under its own power.

Arriving at dump, Tournarocker backs to edge of bank. Big 4-wheel air brakes, plus front-wheel drive, give operator confidence for fast dumping, maneuvering.

1 "C" Tournarocker

Coal miners today are working many seams never before considered practical — thanks to new techniques in drift-mining and refuse-removal. Take the two Red Parrot Coal Company seams near Prenter, West Virginia, for example. Here's how they operate:

Red Parrot (division of North American Coal & Dock Corp., Cleveland, Ohio) removes coal from the mine in 2½-ton cars . . . dumps it into a "rope and button" conveyor running to the tipple and washer. Refuse — mostly slate and bone coal — is conveyed to an overhead bin several hundred feet above the plant. Then . . . to complete the company's time-saving, labor-saving mechanization . . . Red Parrot hauls refuse from bin to dump with a C Tournarocker. Production records show this *one* 18-ton Rear-Dump does the work of *three* 6 to 8-ton dump trucks on the refuse-removal operation.

16 loads per hr. on 3000' cycle

Working 2 shifts a day regardless of weather, Tournarocker is chute-loaded at the bin with

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(Pottsville Region)

Tournarocker speeds from conveyor bin to dump in 3rd gear with full load of refuse. After 2,000 hours operation, owners report 98% mechanical efficiency.

does work of 3 trucks

15 tons of slate and bone coal in an average of 18 seconds. It hauls 1500′ to the dump in 1 minute 24 seconds . . . dumps in 6 seconds . . . and returns to the bin in 1 minute 20 seconds, for an average speed of 12.6 m.p.h. Rig completes the 3000′ round trip in 3 minutes 6 seconds . . . makes 16 trips per 50-minute hour. Hourly production averages 240 tons. No wonder Outside Superintendent F. Mason Morgan says, "We are well pleased. Tournarocker works better than any rubber-tired equipment we've used." He adds, "Operator efficiency is up, too."

Get facts for your work

Whenever you have rock, ore, or shovel-dirt to move, your best bet is Tournarocker. Available in sizes from 9 to 50 tons, 122 to 450 h.p. Constant-mesh transmission, torque converter, electric body heating unit, are optional. See your LeTourneau Distributor for factual job reports on work like yours. Let him arrange to show you rear-dump Tournarockers at work in your area.

Rocker body tips to vertical, dumps instantly, clear over bank. Requires less clean-up, reduces cycle time. Rig's simple, sturdy design (no frame, no sub-frame, no springs, no hydraulics) saves on maintenance, too.

Tournarocker—Trademark Reg. U. S. Pat. Off. R-218-CM

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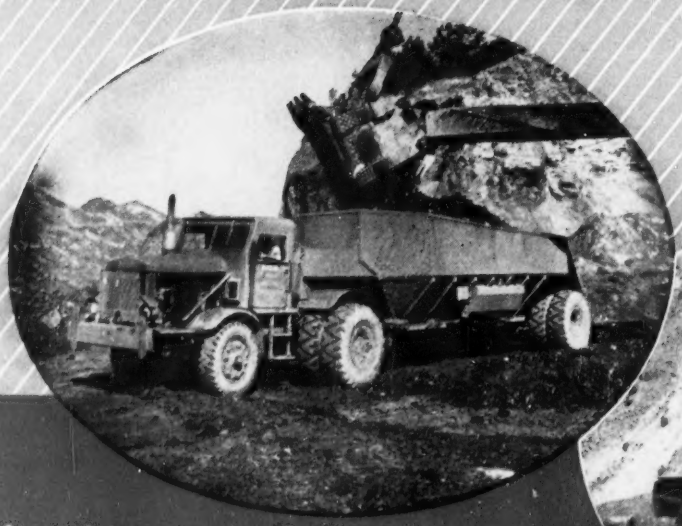

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Built for tough off-the-highway hauling, Rear-Dump and Bottom-Dump "Eucs" have stepped up production and cut hauling costs on hundreds of open pit mining and quarry operations.

Euclids have proved their efficiency and long life in hauling a wide variety of materials . . . coal, ore, rock, overburden and other heavy excavation. Bottom-Dumps are powered by diesel engines of 190 to 300 h.p. . . . loaded speeds up to 34.4 m.p.h. . . . available in 20 to 40-ton capacities. Rear-Dump "Eucs" have travel speeds up to 36.3 m.p.h. . . . powered by diesel engines of 125 to 400 h.p. . . . range in capacity from 10 to 34 tons.

Your Euclid Distributor has performance data on jobs similar to yours. Ask him for a Euclid hauling cost estimate — there's no cost or obligation.

The EUCLID ROAD MACHINERY Co. • CLEVELAND 17, OHIO

EUCLIDS *Move the Earth*

COAL MINING

Vol. XXX January, 1953 No. 1

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WOOD TAMPING POLES

For Tamping Explosive Shots: Poles are round made of Hardwood. Sizes to 10 ft. long.

1" Dia.	8c per lineal ft.
1⅛" Dia.	12c per lineal ft.
1¼" Dia.	14c per lineal ft.
1⅜" Dia.	16c per lineal ft.
1½" Dia.	18c per lineal ft.
1⅞" Dia.	28c per lineal ft.
2" Dia.	32c per lineal ft.

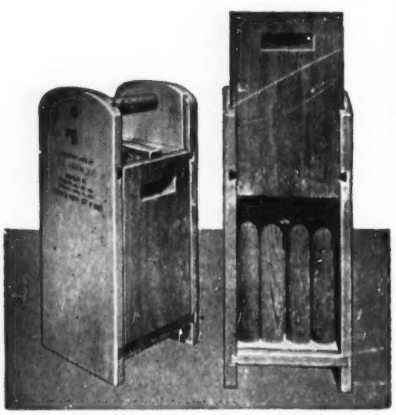
Special diameters and lengths can be furnished. These Poles meet the requirements of the New Federal Mine Safety Code.

SECTIONAL TAMPING POLES

These Poles are made of straight grained wood and are coupled together with removable wood pins held in place in recessed grooves by a rubber band and can be quickly connected and unconnected.

Couplers and Head Blocks are 4, 5, and 6 inches in diameter. Please specify size when ordering. Poles are 1½ inches in diameter.

Head Blocks	4" Dia.	$3.70	Ea.
Couplers	4" Dia.	3.90	Ea.
Poles 12 ft. long	1½" Dia.	3.60	Ea.
Poles 14 ft. long	1½" Dia.	4.20	Ea.
Poles 16 ft. long	1½" Dia.	4.80	Ea.
Poles 18 ft. long	1½" Dia.	6.30	Ea.
Poles 20 ft. long	1½" Dia.	7.00	Ea.
Poles 22 ft. long	1½" Dia.	8.80	Ea.
Poles 24 ft. long	1½" Dia.	9.60	Ea.



EXPLOSIVE BOXES: Made entirely of wood having no metal parts, tongue grooved and dovetailed construction with automatic lock using a rubber band for a spring, treated with paraffin to make moisture resistant. "Approved by the Pennsylvania Department of Mines." Sizes as listed based on 1¼" x 8" sticks.

Powder Box Prices are as follows:

No. 9 Powder Box	$2.55	Ea.	
No. 12 Powder Box	2.95	Ea.	
No. 16 Powder Box	3.15	Ea.	
No. 20 Powder Box	3.90	Ea.	
No. 25 Powder Box	$5.10	Ea.	
No. 36 Powder Box	6.50	Ea.	
No. 50 Powder Box	7.60	Ea.	
No. 72 Powder Box	8.70	Ea.	

Detonator Box Prices are as follows:

No. 6 size 2½" x 3" x 6" inside $2.15 Ea. No. 8 size 2" x 2½" x 8" inside $2.15 Ea.

J. V. Hammond Company Spangler, Pennsylvania

Do You Know?

● The major emphasis in science and technology in 1953 will continue to be upon machines and methods of military usefulness in order to make our nation stronger. Fear of further communist aggression will control our intellectual as well as our industrial future, even if further actual attacks do not occur.

Hidden by military security, new air weapons that will outmode both the pursuit plane and bomber are being developed. Human pilots are on the way to becoming obsolete, while the possibility of delivering an atomic or hydrogen bomb anywhere on earth from anywhere else is approaching reality. During coming months we shall probably hear more about these aerial weapons, but the ultra-speedy jets and inter-continental bombers will hardly be replaced within the coming year or even several years.

More hydrogen or fusion superbombs will be tested in 1953 and an atomic bomb will be fired from the new atomic cannon. Power from the atom for military purposes will not be actually applied, and the use of atomic power in any major way will still be for the future at the end of the year.

The true intercontinental guided missile will some day actually exist. It will be capable of delivering with accuracy to any point on the earth's surface an atomic bomb of great destruction, and its speed and altitude will make it almost impossible to intercept.

To support our essentially military technology, more and more scientific and technical personnel will be needed and the present and future manpower shortage in science and engineering will continue a matter of concern.

Through the application of the numerical computers or "brains" that operate electrically, there may come some improvements in forecasting the weather, which is now done by human analysis and synthesis of a spread of observational information. Tests will be made in 1953 to see whether masses of world-wide figures can be fed into the computers to produce results as reliable as the effective synoptic forecasts of today.

Systems under which electronic computers will "learn" to set themselves up, or "program" themselves, before starting a computation, will be developed. This will take a big load off the mathematicians supervising the machines.

Applications of transistors to communication and other electronics fields will continue, with development continuing. High terperature rectifiers and transistors made from silicon and silicon alloys will come into wide use. Our telephones, TV and radio, radar and everything else electronic will benefit from this wide new field.

As human knowledge of the cosmos expands, its dimensions change and new light is thrown on our place in the vast order of things. Look for some new dimensioning of the space.

Here and There in the Coal Industry

● The Crozer Coal and Land Co. has announced its acquisition of control of the Turkey Gap Coal and Coke Co.'s operations at Dott, W. Va. The Turkey Gap Co. will be liquidated and dissolved and the operations absorbed as a division of the Crozer Company. W. E. McQuoil will continue as General Manager of the mines at Dott. Samuel A. Crozer is President and W. F. Leatherman, Secretary-Treasurer of the company.

R. D. Stockdale, Vice President, Red Jacket Coal Corp., presided at the afternoon session, Nov. 11, of the National Coal Association convention at the Waldorf-Astoria, New York.

● Chairmen of the various permanent committees of the Coal Trade Association of Indiana, for the fiscal year 1952-53, have been named by James W. Morgan, President of Ayrshire Colliers Corp., who was elected President of Coal Trade Association at the organization's recent annual meeting.

P. H. Templeton, Secretary-Treasurer of the Templeton Coal Co. and immediate past President of Coal Trade, is Chairman of the Executive Committee. O. L. Scales, Enos Coal Mining Co., heads the Traffic Committee; W. R. Schott, Enos Coal Mining Co., the Smoke Abatement Committee; B. C. Dudley, Maumee Collieries Corp., the Standard Coal Contract Committee, and Robert G. Nunn, Hickory Grove Coal Mining Co., Finance Committee.

In addition to Mr. Morgan, other officers recently elected include David Ingle, Jr., President of Ingle Coal Corp., as Vice President and C. C. Lydick, Managing Director.

Directors named include Mr. Templeton, Mr. Scales, Mr. Nunn and the following: Gregory S. Devine, Truax-Traer Coal Co.; W. S. Webster, Walter Bledsoe & Co.; Hugh B. Lee, Maumee Collieries Corp.; Reed Moyer, Central Indiana Coal Co.; L. B. Girard, Illinois and Indiana Southern Coal Co.; V. C. Kibler, Blackfoot Coal and Land Co.; William H. Cooke, Pandora Coal Corp.; H. P. Smith, Princeton Mining Co.; and L. G. Wasson, Wasson Coal Mining Co.

● George H. Love, president of Pittsburgh Consolidation Coal Company, announced today that the company's Board of Directors has accepted with regret the resignation of George M. Humphrey as a member and chairman of the Board.

Mr. Humphrey was recently named Secretary of the Treasury in President-elect Eisenhower's new cabinet.

The director's expressed their appreciation to Mr. Humphrey for his part in the formation of Pittsburgh Consolidation Coal Company and for his great help in the early planning of the business and its conduct during the past seven years.

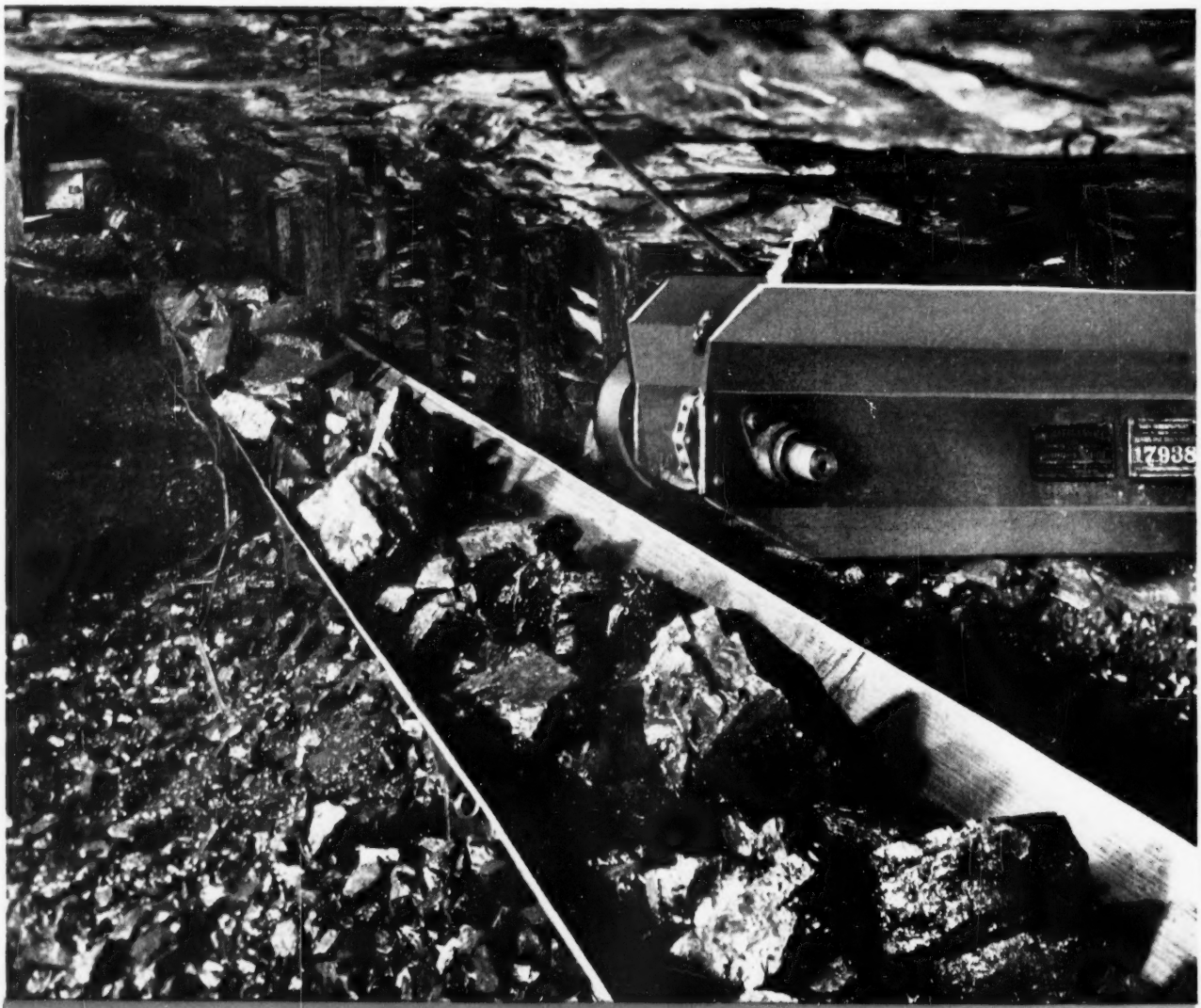
At the same time, Mr. Love announced two executive promotions.

G. A. Shoemaker has been advanced from the position of vice president to the office of executive vice president.

S. M. Cassidy has bcome a vice president of the parent company with headquarters in Pittsburgh, effective immediately. In addition to his new duties, Mr. Cassidy will continue to serve in his former capacity as president of the Consolidation Coal Company (Ky.) Division.

● The regular annual meeting of the Southern Coal Producers Association was held December 8 at the Association's headquarters in Washington, followed by the group's regular quarterly meeting.

The Southern Association re-elected all officers and directors, with only one change. J. T. Reams, General Manager of the Clear Fork Coal Co., Middlesboro, Ky., was elected as a Director to succeed Charles R. Griffith, President of the Southern Coal and Coke Co. of Knoxville, Tenn. The officers re-elected include Joseph E. Moody, President and Director-at-Large; Walter R. Thurmond, Secretary; Laurence E. Tierney, Jr., Treasurer.



125-40

JEFFREY *Underground* CONVEYORS

● Illustrated is a Jeffrey entry conveyor into which room conveyors are discharging. The design and construction of these conveyors are the result of years of experience in meeting mine operators' needs for dependable, low-cost haulage. Each type has been thoroughly proved in operation under all kinds of operating conditions.

Rugged construction; Durable materials; Light weight design to facilitate moving; Simplified method of coupling sections; Dependable power equipment—are a few of the many design and construction features that result in economical operation and maintenance as well as safety to both equipment and workmen.

In addition to the chain type conveyors shown, Jeffrey offers a complete line of belt conveyors for main line haulage. Many of these are operating in conveyor and shuttle car equipped mines—another link in the Jeffrey line of cost saving mine equipment.

Consult a Jeffrey Engineer for specific details or write for catalog No. 820.

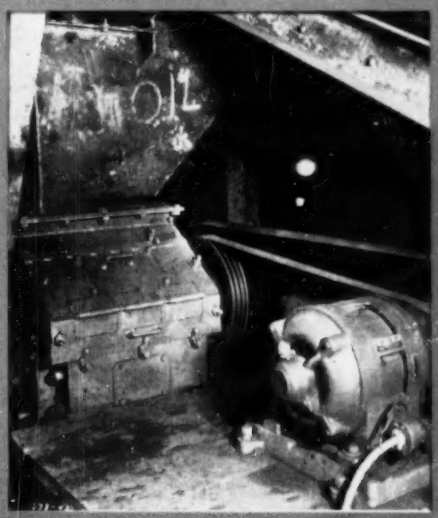
To meet specific size requirements

JEFFREY CRUSHERS

● To meet the exacting demands of today's coal markets, no one type of crusher can meet all requirements. Jeffrey's long experience in helping operators with coal sizing problems has resulted in developing a variety of types, each designed to answer a definite need. Each machine is adjustable to give uniform runs on a wide range of product sizes.

Jeffrey has a staff of trained reduction engineers to help you obtain the unit best suited to your needs. In addition, Jeffrey maintains a complete laboratory for running tests to help you obtain desired results. This is a Jeffrey service and entails no obligation on your part.

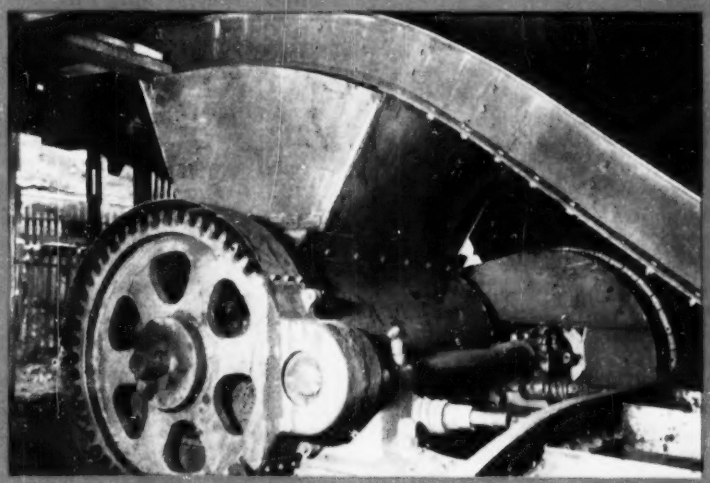
Consult a Jeffrey Engineer on your coal sizing problems. Catalog 784-A gives you pertinent data as to the various types and sizes of units, and to range of coal sizes and capacities.



638-42

Above—A 20" x 24" Flextooth Crusher installed in an Ohio mine producing a premium size product.

Right—A 30" x 36" Single Roll Crusher installation in a Kentucky mine reducing the entire output of the mine to various sizes.



658-42

THE JEFFREY MANUFACTURING COMPANY Established 1877

912 North Fourth St., Columbus 16, Ohio

1877 75 YEARS 1952

Baltimore 2, Beckley, W. Va., Birmingham 3, Boston 16, Buffalo 2, Chicago 1, Cincinnati 2, Cleveland 15, Denver 2, Detroit 13, Forty Fort, Pa., Harlan, Ky., Houston 2, Jacksonville 2, Milwaukee 2, New York 7, Philadelphia 3, Pittsburgh 22, St. Louis 1, Salt Lake City 1

Jeffrey Mfg. Co. Ltd., Montreal, Canada
British Jeffrey-Diamond Ltd., Wakefield, England
Jeffrey-Galion (Pty.) Ltd., Johannesburg, S. A.
The Galion Iron Works & Mfg. Co., Galion and Bucyrus, Ohio
Galion (Great Britian Ltd.), Wakefield, England
The Ohio Malleable Iron Co., Columbus, Ohio
The Kilbourne & Jacobs Mfg. Co., Columbus, Ohio

Decline Belt Conveyor Drives*

By R. U. Jackson
Manager, Mine Conveyor Sales and Development
Robins Conveyors Division Hewitt-Robins Incorporated

Decline belt conveyors are rapidly becoming the accepted medium for conveying bulk materials such as ores, stone, coal, etc., from high level mining areas to lower level preparation plants for rail and water transportation to market.

One of the methods being replaced by decline belt conveyors is comprised of long, steep chutes which are equipped with offset ore or coal pockets spaced at intervals

Figure 1

to retard the speed of the material. These were usually placed on steep grades and degradation of the material, along with high maintenance, was a liability.

Another system being replaced is comprised of long, steep circular steel tubes, of three to six foot diameters which required close supervision to obtain even a semblance of efficient operation. For satisfactory operation, it was necessary to keep the tube full of material and to withdraw from the bottom at the same rate as the feed at the top. Here again was the high percentage of degradation, high maintenance, and the hazard of freezing in cold weather.

Two other systems paralleled each other: the decline scraper conveyor. Both systems were based on steel flights riding the bottom of a carrying trough—the scraper using chains and flights, while the other used a steel cable with buttons attached at spaced intervals. With both systems, you had a high percentage of degradation, high maintenance costs and, also, an unknown factor in frictional resistance of the material in contact with the trough. This factor changed constantly with the change in moisture content of the material. Also, it changed with every different coal seam. To properly design this type of conveyor, it was necessary to alter the friction factor to suit each material handled, with the result that many units were installed with the power units either too large or too small.

Another system was the inclined plane, using either cars or skip buckets. Here you have another degradation system, with both the loading and unloading of the skip. This is also a high maintenance system and has the disadvantage of intermittant transportation, requiring balancing bins both at the discharge and the feed ends.

With the decline belt conveyor, you have the advantage of continuous transportation, uniform discharge to the preparation plant, and a system that can be under observation at all times during operation. The material load rides stationary on the moving belt with minimum degradation. The elements of the conveyor equipment are known factors, such as the weight of moving parts and the frictional resistance of the idler bearings. You can safely design a belt conveyor and know that the results are within the required limits of all equipment and the power unit. With the declined belt conveyor, you have an efficient unit from which you can obtain the maximum of power regeneration for use elsewhere in your plant.

(At this point, I would like to call your attention to the versatility of belt conveyors. We have installed belt conveyors at the coal mines on the island of Spitzbergen, Norway, above the Arctic Circle, which have operated at temperatures of minus 40 degrees F. What other system of transportation would operate efficiently under these conditions?)

The following figures have been prepared to show a few decline belt conveyor drive arrangements with their respective conveyor outlines. Data pertaining to conveyor length, decline drop, material handled, capacity, and power are given to show the requirements of each unit. Design formulae, stress analysis, etc., are not treated in this paper. However, no conveyor discussion could be concluded without calling attention to certain features of design and equipment that are now considered necessary or advisable for good operation. Some of these features will be reviewed later.

Figure 1 — This 36-inch belt conveyor was installed in Pennsylvania in 1925 and was one of the first decline belts of that length. It is on 710 ft. centers, declined 112 ft., handles 100 tph of ROM coal at a belt speed of 110 fpm. It is equipped with plain bearing idlers and powered by a 10 hp. motor. This conveyor was supported on wood frames and mounted on mud sills, thus giving a variable belt line of 6 to 12 degrees as it followed the ground contour. The conveyor was designed using standard idler friction factors of that date, indicating only -0.88 hp. required when fully loaded on the

Figure 2

decline section. Because of this low negative power requirement, we located the drive at the discharge end for convenience in interlocking with the tipple equipment, but soon learned that it was necessary to install a solenoid brake on the tail shaft to provide against a long over-travel with power failure or normal stopping under load. This has been a very successful unit and is still in operation with most of the original equipment.

** A paper presented at the 4th Biennial Materials Handling Conference sponsored by Westinghouse Electric Corporation at Buffalo, New York, October 28 and 29, 1952.*

Figure 2 — This 30-inch conveyor was installed in West Virginia in 1938. You might question the declination of 22 degrees for the belt, but the coal handled was very friable, shot hard with powder, and had so few lumps that no spillage troubles were encountered. The conveyor is on 312 ft. centers, declined 78 ft., handles 200 tph of ROM coal at 250 fpm. Against our engineering recommendation, the original drive was installed as shown. The idea being to utilize the power required for the shaking feeder to help brake the conveyor —also, to eliminate the extra motor and drive reduction for the feeder. Originally, the conveyor was powered with a 10 hp. motor, had a solenoid brake on the extended motor shaft and a centrifugal governor. When the conveyor belt overspeeded, due to excess load being fed, beyond the ability of the motor to regenerate braking power, the centrifugal governor interlocked with the motor, opened the circuit, and applied the brake. During trial operations, this severe braking became so frequent that the solenoid brake shoes soon failed and the governor finally ran away. In fact, the faster the belt ran, the faster the feeder operated which in turn fed more coal and increased the belt speed, until the bin over the feeder was emptied. We were then permitted to install a drive as originally recommended. This included a separate feeder drive and motor, increasing the conveyor motor to 15 hp., the same solenoid brake but with the centrifugal governor interlocking the feeder motor only. When the belt started to overspeed, the centrifugal governor stopped the feeder, but regenerative power was retained for braking at the belt. As soon as part of the load was discharged from the belt, it returned to normal speed and the feeder started operating. The solenoid was only used for power failure or stopping the system.

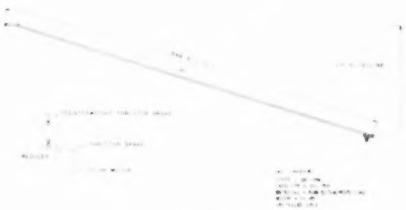


Figure 1

Figure 3 — This 36-inch decline belt conveyor was installed in West Virginia in 1945. It is on 1485 ft. centers, with a decline drop of 249 ft. The conveyor handles 250 tph of ROM coal with a belt speed of 312 fpm. Estimated regenerative power is 40 hp., and a 50 hp. motor was used for regenerative braking. This conveyor was speeded about 25 percent in order to maintain a belt tension suitable for use of standard construction belt and at the same time retain good belt troughing. The drive is from a single pulley, rubber lagged and well snubbed, using a chain reduction gear and equipped with a solenoid brake mounted on the extended motor shaft. The centrifugal switch is V-belt driven from the high speed shaft of the reducer and interlocked with the control of the feeder. The operation is similar to that shown in Figure 2.

Figure 4 — This 36-inch conveyor is on 848 ft. centers, declined with 241 ft. drop, handles 350 tph at 300 fpm and is motored by a 75 hp. motor for regeneration. It is operated similar to the conveyor shown in Figure 3 except that an extra precaution was taken by installing two thruster type brakes: one on the extended shaft of the drive pulley, and one on the extended high speed shaft of the reducer.

Figure 5 — This shows a decline conveyor system for handling iron ore from the mine of Cia Vale Do Rio Doce, Itabira, Brazil. The system is composed of four 36-inch belt conveyors with lengths of 894 ft., 500 ft., 1048 ft., and 784 ft. They handle the iron ore at a rate of 960 long tph, with a belt speed of 360 fpm. The estimated power varies from -103 hp. to -119 hp.

The feed to this decline conveyor system is from a special feeder and tunnel conveyor located underneath a surge pile. Because the ore varies in weight between 150 and 200 pounds per cu. ft. a weightometer is provided on the tunnel conveyor. This weightometer is electrically interlocked with the variable speed drive of the feeder in such a way that when the ore runs light, the feeder is speeded and when the ore runs heavy, the feeder slows down. By this means, the tonnage to the decline belts is held fairly constant at 960 long tph. The same drive of 125 hp. has been provided for all four conveyors. Each motor is equipped with a thruster-operated brake, a centrifugol overspeed relay, a centrifugal speed starting relay, a reduced voltage reactor type automatic magnetic controller and the necessary protective features.

A main control station is located in the screening station which is fed by Conveyor No. 4 of the decline conveyors. This control is a complete floor-mounted metal enclosed operator's cabinet, in which are flush mounted push button stations and red indicating lights for each unit, including the controls for the screening station units, the feeder and tunnel conveyor under the surge pile, as well as the four declie conveyors.

After the operator receives his light signal showing the screening station units in operation, he starts Conveyor No. 4 and allows it to come up to full speed, at which time a red light glows on his board. This is his signal for starting No. 3 belt. When No. 3 is carrying no load, power is required for driving.

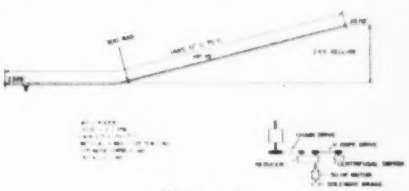
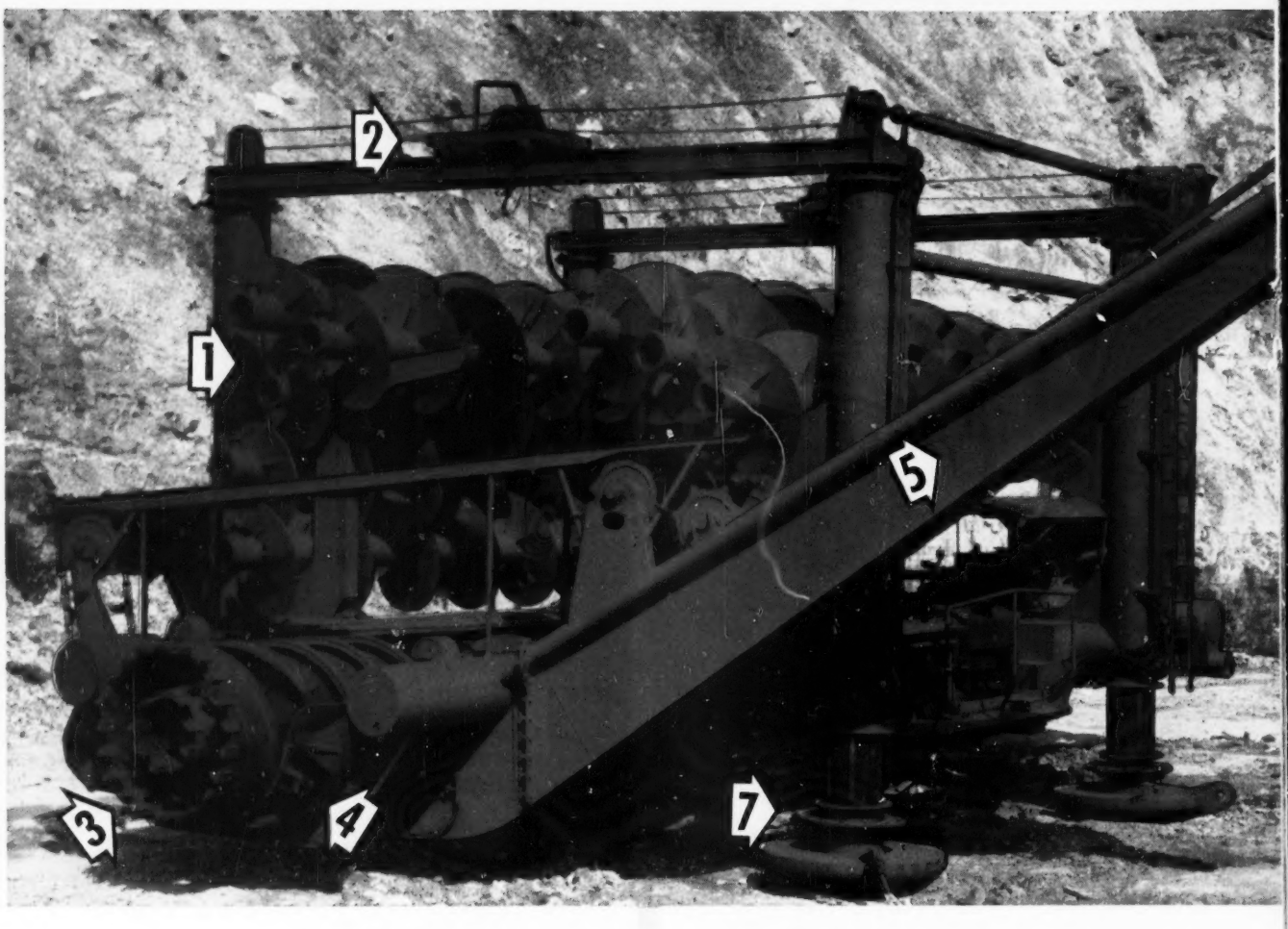


Figure 3

In this case the start button energizes the brake contractor, which in turn energizes the thruster motor and releases the thruster-operated brake. Two timing relays are also energized at this time through a brake contactor interlock and they are set for 6 and 12 seconds respectively. After 6 seconds, timing relay No. 1 closes its interlock which connects the startng reactor in the line and applies reduced voltage to the motor. Timing relay No. 2 has been set for 12 seconds and after that time, it closes its contact and connects the motor to the line. It is not intended, however, that timing relay No. 2 shall come into play under normal operating procedure and its timing, as well as the reduced voltage applied by relay No. 1, should be field adjusted so that the centrifugal speed relay will act first. This centrifugal speed relay, which is driven by the drive snub pulley shaft, also has its interlock connected in series with the run contactor on the starter.

When the conveyor has reached rated speed, this interlock closes, energizing the run contactor and

(Continued on Page 16)



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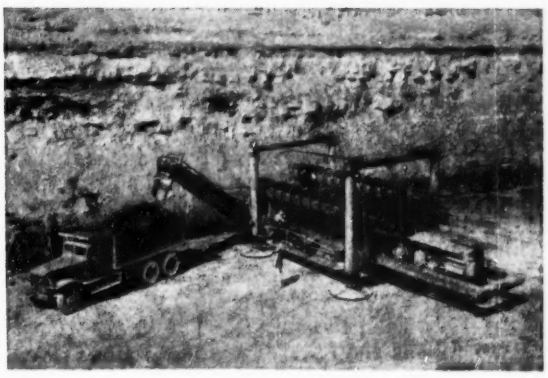
SPECIFICATIONS

Model 42	Model 56
Length: 42 ft. Weight: Approx. 33 T.	Length: 56 ft. Weight: Approx. 50 T.
Carries nine 21 ft. auger sections.	Carries six 34 ft. auger sections.
Required pit width: 45 ft. minimum.	Required pit width: 60 ft. minimum.
Power: 225 hp Diesel engine.	Power: 300 hp Diesel engine.
Hydraulic frame jack lift: 66 inches.	Hydraulic frame jacklift: 66 inches.
Auger Diameters: 48 inch to 30 inch.	Auger Diameters: 52 inch to 30 inch.
Possible drilling depth: 189 ft.	Possible drilling depth: 204 ft.

Hydraulic frame jack lift permits drilling of single holes or overlapping holes.

Self Contained Coal Auger



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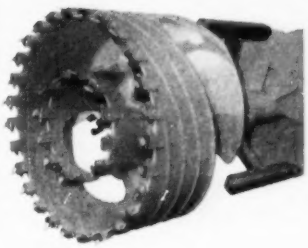

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Decline Belt Conveyor Drives

(Continued from Page 13)

connects the motor to the line. This point of transfer will be made so near to synchronous speed that the transfer will be accompanied by a very low transient torque condition and without adding extra stress on the belt.

When the conveyors are fully loaded, the start button energizes the brake contactor, thereby releasing the brake. The two timing relays are also energized at this

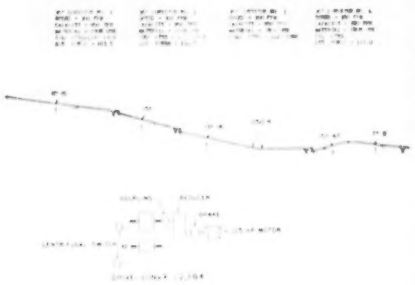


Figure 5

time, but as they are set for 6 and 12 seconds and the fully loaded conveyor will come up to speed in four or five seconds, neither one will act, for the centrifugal speed relay will connect the motor to the line. Since the motor is up to synchronous speed, the closing of the run contactor will have no effect on the line conditions, so the motor proceeds to regenerate power.

When conveyor No. 3 is running at full speed, its red indicating light glows on the control panel and the operator pushes the start button for No. 2 and the same sequence is followed.

As a safety precaution against the possibility of a power failure, a second centrifugal speed relay protects the equipment against "run-away."

As a further safety measure, two limit switches have been provided on the thruster brake of each slope conveyor to assure the setting of the brake before the motors are actually removed from the line. Since this is a regenerative system, the motor and conveyors would "run-away" if removed from the line and the brake failed to set.

When stopping operations at the end of a day or shift, the operator stops the feeder under the surge pile, then clears the system completely before leaving his station. However, contingencies do arise wherein part of the system must be stopped without clearing the belts, which requires stopping under load. Due to the physical characteristics of each individual conveyor, the time interval required to stop each conveyor under load varies. This would cause a pile up of material in the junction chutes between the conveyors, if they were all stopped simultaneously. These chutes have adequate capacity to take care of these pile-ups and they will occur under emergency stopping. They are not desirable, however, during normal operation and in order to avoid them, the "Multiflex Timer" has been added to the control panel. Through this Timer, the operator may stop the four slope conveyors in sequence with the proper time delayy between each conveyor, starting with the tunnel belt on Conveyor No. 1.

This one system of multiple decline conveyors in tandem is described in more detail than the single units because with all multiple units the control problem is more complicated and the hazards of operation more serious.

Even though the system of multiple units described is not old and possibly many more systems of similar design will be installed in the near future, the trend of today is away from the age of complicacy to the age of simplicity. Who knows but what a design for decline conveyors will be developed soon, where one unit conveyor will be installed rather than four, or for even greater lengths and greater drops with greater tonnages, without the use of more expensive belting. With one conveyor all complicated interlocking control would be eliminated and more important, all degradation at the many transfer points would be eliminated.

Additional equipment in the form of controls are advisable for all belt conveyors, including decline units. One such unit is a differential limit switch. This control is designed to detect slippage between the conveyor belt and the driving pulley. The reasons for using this control are: first, to advise the operator that proper slack-side belt tensioning is not being applied for driving; second, to eliminate the hazard of a serious fire from heating of the pulley lagging and the belt; third, to prevent belt damage.

Figure 6 — This shows a diagram of a mechanically operated differential limit switch only. Possibly an electrical type can be designed to function with equal accuracy. This unit operates as follows:

During normal operation with virtually no slip between pulley and belt, the V-belt sheave, riding against the belt, rotates at a higher speed than the roller riding against the drive pulley because it is of smaller diameter. The sheave is mounted on one through shaft of the differential and the roller is geared with a 1 to 1 ratio to the other through shaft of the differential. The gear of the differential rotates in the direction of the

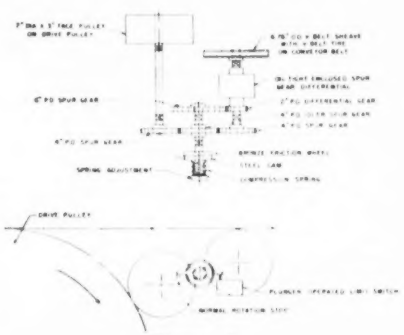


Figure 6

higher speed through shaft, from the sheave, at half the difference in speed of the two through shafts. This rotation is transmitted to a bronze friction wheel and a steel cam is compressed against and obtains its rotation from the friction wheel. This cam will rotate to the "normal rotation stop" and will rest there. Rotation of friction wheel will continue.

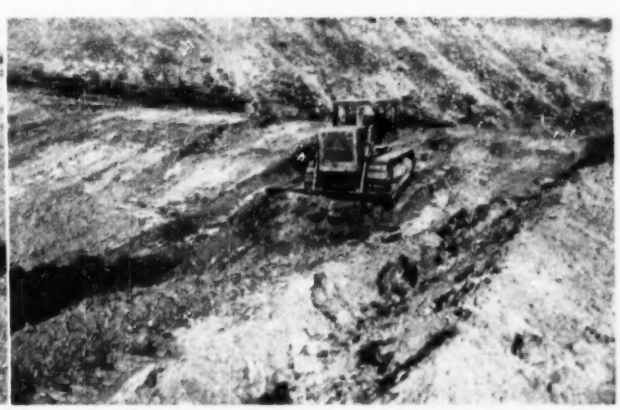
The diameter of the V-Belt sheave is calculated so that operation with 3 per cent slip between pulley and belt, the speed of the sheave is the same as the 7-inch diameter pulley. With any slip beyond 3 per cent, the 7-inch diameter pulley is rotating the faster of the two and the differential gear changes direction, which reverses the friction wheel and the cam. The cam then operates the limit switch which, normally closed, will open the circuit. The limit switch is snap action and maintained contact and therefore as the the speeds of the pulley and belt reduce and equalize in stopping, and the direction of the differential gear and cam reverse, the circuit will not close. The limit switch is manually reset and must be reset at the switch. The cause of slippage must be or should be corrected before further operation.

(Continued on Page 21)

Latest Type Stripping Shovel Feature in Two-Seam Operation

The recent increase in coal miners' wages and in Security payments has closed high cost deep mines by the hundreds in the so-called fringe areas in all coal producing territory. One of these fringe areas is the coal bearing territory of Central and Northwestern Pennsylvania where the coal seams are thin and outcrop. In that area not only the mines that were small and were recently opened had to close but some of the larger mines that have operated many years have had to suspend operation.

Lying in outcrop areas much of that coal is strippable and the markets for it are being supplied by stripping. In the Northwestern territory, near the town of New Bethlehem, the Iseman Coal Company is stripping two seams that lie 30 feet above one another and outcrop in the hillsides. These are the Upper and Lower Freeport coals, the Upper running 42 inches thick and Lower 28 inches thick. Overburden from 10 feet to 60 feet thick is moved with a new Lima Model 2400 shovel having 75 foot boom, 50 foot stick and 4½ cubic yard dipper, making 90 foot wide cuts. The coal is hauled about two miles to a tipple near New Bethlehem.



Guy Little, Penn Machine Co.; Kenneth Bartlett, Div. Supt., Bethlehem Collieries Corp.; Ed Siemon, President of this Association.

Left: Herb Brown, Brown-Fayro Co.; D. R. Sowers, Div. Eng., Bethlehem Collieries Corp.; Jack Malady, Pittsburgh Mgr., Lewis-Allis.

Last Golf Party of the 1952 Season by the Western Pennsylvania Coal Operators

Electronics in the future may perform functions now hardly dreamed of, it was suggested at the National Electronics Conference by Dr. E. W. Engstrom, vice president in charge of RCA laboratories. He reviewed in brief electronic applications of today, particularly in radio, television, military equipment and the rapid computors that solve in minutes problems that would require weeks or months by older methods.

As new instruments and vehicles come into being they are ever more complex, he stated. Electronics has grown from a simple means of contact and communication into the central nervous system of our industrial might. More and more, electronics is assuming functions formerly performed by man's mind. This is a requirement of the increase of speed of vehicles and carriers. Man's mind interprets vital data too slowly to keep track of many modern machines. The ultra speed of electronic detectors, computors and controls is now necessary.

The electron tube became the lever-arm of radio and electronics. It is the keystone of all apparatus and techniques upon which the present ever-expanding industry depends. Electron tubes are now being supplemented by semi-conductors whose conductivity can be influenced by radiant energy, elec-

Left: J. E. Servant, R. G. Gehlsen and Russ Vance of the Joy Manufacturing Co.

Left: A. R. Werft, Engineer, Frick Coke Co.; J. W. Milam, Joy Mfg. Co.; and Dick Johnson, Mine Safety Appliance Co.

H. Nyquist, Joy Mfg. Co.; Martin Valera, Buckeye Coal Co.; B. Connorh, Div. Supt., U. S. Steel Co.; T. E. Foster, Manufacturers Representative.

Left: W. S. Peters, Stimple and Ward; C. E. McGlaughlin, Bituminous Coal Research Inc.; Fred Calley, Penn Machine Co.; John E. Bigley, Mt. Pleasant Div., U. S. Steel Corp.

tron bombardment and by applied voltage. This is important because it provides a new tool and creates a new freedom in designs. It means wider and added services and uses.

With its unlimited ability to count, remember and control, its capacity for accuracy, its comprehensive coverage, its facility to operate tirelessly and without fatigue, is electronics literally asking to take over certain duties which have been performed by men's minds, that is, thinking processes. What man can conceive, comprehend and perform, he will be able to construct in electronic systems to do his bidding and the electronic performance will be at least as effective as the human performance.

Like in all other industries, the coal mining will have to catch up and keep its place along with ever-expanding industries. At the moment much more has to be done to train minds of the men who will manage the new kind of mining and operate the new automatic machines that are coming. We need much more trained mentality—that something that has always given man what he wanted when he needed it. The great demand for trained personel is making it necessary for each industry to choose mostly from its present employees the manpower it will need in the future and develop it to suit its requirements.

At gatherings such as these golf parties, where the supposidly best brains of the industry gather, is a very good time and place to start talking about electronics and other automatic equipment.

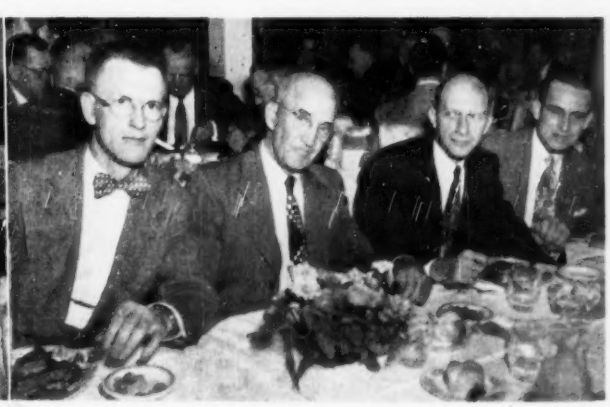
● Automatic machines that watch the products they make are becoming a necessity today in plants that must maintain tight quality standards, H. L. Waddell, editor of Factory Management and Maintenance, told the American Society of Mechanical Engineers meeting here today.

The machines do not pay for themselves solely by eliminating a worker or several workers, he said, but rather by cutting down waste. The cost of the extra equipment needed to produce 10 units to get five acceptable units is eliminated. The cost of reworking or scrapping unacceptable units also is slashed.

Mr. Waddell said he did not think that increased use of automatic machines would bring about grave problems of unemployment.

"If ultimate automation of every major factory were to arrive in a short span of time," he said, "the dislocations would certainly be serious. But it's obvious that ultimate automation will not take place in every company on the same day —or the same year. So I have every confidence that the 'economic feedback control' within our competitive system will prevent major dislocations."

Left: T. P. Latta and W. E. Hart of the Crucible Fuel Co.; C. H. Dorsey of the R. G. Johnson Co.; and G. C. Young, DuPont Powder Co.



Left: C. B. Tillson, Jr. Asst. Supt., Crucible Fuel Co.; Fred M. Davis, Brown-Fayro Co.; G. L. Bolender, Eng., Republic Steel Corp.; G. F. McElwee, General Electric Co.

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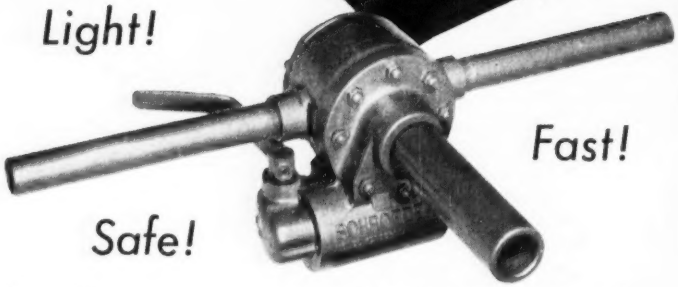

Powered from the hydraulic power system of standard mining equipment, the Schroeder 12-B Coal Drill provides plenty of power for fast drilling with complete operational safety—never any spark, kick, or shock—all electrical hazards are removed yards from the drill! Lightweight and dependable, its design simplicity and minimum of parts result in greatly reduced maintenance costs.
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A SCORE OF MAIL SACKS, weighing 70 pounds each, are shown leaving the Educational Division of the Bituminous Coal Institute, Washington, D. C. They carry outgoing shipments of teaching aids on coal—bulk quantities requested by teachers—including the new and popular "Class Report" booklet. BCI serviced 73,000 such requests in the past 12 months, mailing out 814,000 pieces of printed matter. BCI Mailroom employees pictured handling nearly three quarters of a ton of literature—one day's work—are Andrew Cole, left, and Charles Frazier.

● Development of a new conveyor belt weighing system capable of electronically adding, subtracting and recording the tons per hour of material delivered to one or more points was announced recently.

The new belt system, developed jointly by the Trans-Weigh Company, Wayne, Pa., and the Industrial Division of Minneapolis-Honeywell Regulator Company in Philadelphia, is applicable for belt-conveyed materials ranging from low-grade ore to refined sugar. The system continuously weighs material being delivered and provides running measurements of tonnage as well as the total tonnage delivered over a period of time. These measurements can be transmitted over considerable distance either to a foreman's office or to a central control panel board. Chart records are also automatically maintained.

If one large belt supplies several other belts at different places along its length, the system can add and subtract to measure the quantity supplied to any or all belts, M-H engineers explained. The new system can also control the blending of several different materials on the belt, a common practice in the food industry.

In operation the conveyor belt rides over a set of three idlers, or rollers, which form a wide-based trough. The force exerted on these is measured by a strain guage and the weight of the belt itself and other component parts is subtracted electrically. The final measurements (weight of the material) are fed into an electronic recorder which indicates and records the instantaneous flow and integrates the total weight passing on the belt.

One of the most significant advantages of the new system, according to the Honeywell engineers, is that it now makes cost accounting possible in cases where it previously was either grossly impractical or outright impossible. Here's how this works in a power plant:

In coal-burning power plants the operators need to know how much coal is being delivered at any time and the total delivered over a period of time. With this information power dispatchers can order in advance the exact amount of coal needed by the boilers for each demand period. Utilizing the new

belt weighing system, the coal actually delivered to the boilers can be tallied against coal received and a schedule worked out for power demand vs. coal consumption—thus making cost accounting more precise.

"Another application is measuring ore recovery in smelting plants. Sugar refineries, steel mills, cement plants, fertilizer plants, mines, paper mills—in fact, any industry handling bulk materials can now weigh and control what used to be guessed at, or at best, batch-weighed because of limitations of available equipment," the engineers said.

When applied to rationing or blending materials, such as adding vitamins to grain, or oil to coal or compounding cement, the engineers explained that savings accrued in use of expensive additives through automatic control features would quickly pay for the equipment itself.

• A new series of 15 technical data bulletins descriptive of the complete line of Galion hydraulic hoists is now being issued by the Galion Allsteel Body Company, Galion, Ohio.

Each bulletin includes full specifications for one individual hoist. Among the data listed is: hoist type, weight, stroke, cylinder diameter, mounting height, dump angle and piston rod diameter. Bulletins are profusely illustrated with large close-up hoist photos and application pictures. Hoist pumps are shown in detailed, cut-a-way form.

An interesting bulletin feature is a handy hoist capacity reference table. This permits the user to easily check the body length and approximate overhang against the desired hoist capacity.

Bulletins are so designed as to be easily bound into a complete catalog, or can be used separately for ready reference or mailing purposes.

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• A new smoke-smelling fire alarm is the latest wrinkle in fire protection. Its inventor, Senate Gildice of Owosso, Mich., says it is particularly suitable for protecting warehouses, stockrooms and other places visited only occasionally by a watchman.

When a fire breaks out, the filter becomes partly clogged with smoke particles, cutting down on the amount of air rushing from the outlet. Because of the reduced air jet, a valve at the bottom of the filter assembly settles into place, making electrical contact with the alarm system to warn of fire.

The second outlet, through which unfiltered air is blown, acts as an automatic switch in case something goes wrong with the blower motor, or in case the power fails. When air stops rushing through that outlet, a valve opens the fire-alarm circuit a fraction of a second before the filter valve sets off the warning.

The device received patent number 2,613,359.

The coal industry was conceived in rugged individualism and is dedicated to the principle of free enterprise. It is lead by men of courage and determination second to no other. That leadership will never relax in its efforts to solve the industry's problems. I say with absolute confidence that, if the nation ever suffers from lack of its basic fuel, it will not be the fault of coal's leaders. I am proud to be associated with them. We are not seeking special favors. All we ask—all anyone has the right to ask—is a fair forum before which to plead our cause. We have a right to ask reasonable and equitable treatment at the hands of the government—such treatment is necessary to the continuance of a steady and adequate supply of the nation's basic fuel resource.

Decline Belt Conveyor Drives

(Continued from Page 16)

Limit switches should also be provided to detect side travel of major expensive belt installations to detect poor belt training and guard against belt damage.

The return belt should be located below the supporting deck and conveyor stringers to permit visual inspection of the return belt at all times.

The most important suggestion of all is for management to properly equip maintenance men so they can maintain good housekeeping—the one basic factor that will provide efficient conveyor operation.

SALEM "HERCULES" AUGERS FOR ELECTRIC DRILLS

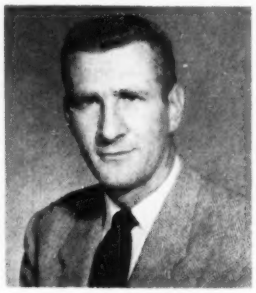
Made To Withstand High Drilling Speed, Whip And Torsional Strain Of Electric Drills

Drills holes faster — Will not snap off shank or chip points — Outlasts four or five ordinary augers.

THE SALEM TOOL COMPANY SALEM, OHIO, U.S.A.

● The Jeffrey Manufacturing Company, Columbus, Ohio, announces the consolidation of two of its Sales Divisions, Coal preparation and Ore Beneficiation, into a new one to be called Materials Beneficiation. William H. Newton will be Manager of Sales. He was formerly manager of the Ore Beneficiation Division. Harold C. Medley, formerly Manager of the Coal Preparation Division has been given charge of research and development for all the Conveyor Divisions, reporting to James A. Flint, Vice-president in charge of Engineering.

● R. G. LeTourneau, Inc., Peoria, Illinois announces the appointment of A. M. (Ben) Krider as Central Sales Manager. He is assuming the managership of the central area after having been District Sales Representative for central Canada and north central U. S.



A. M. KRIDER

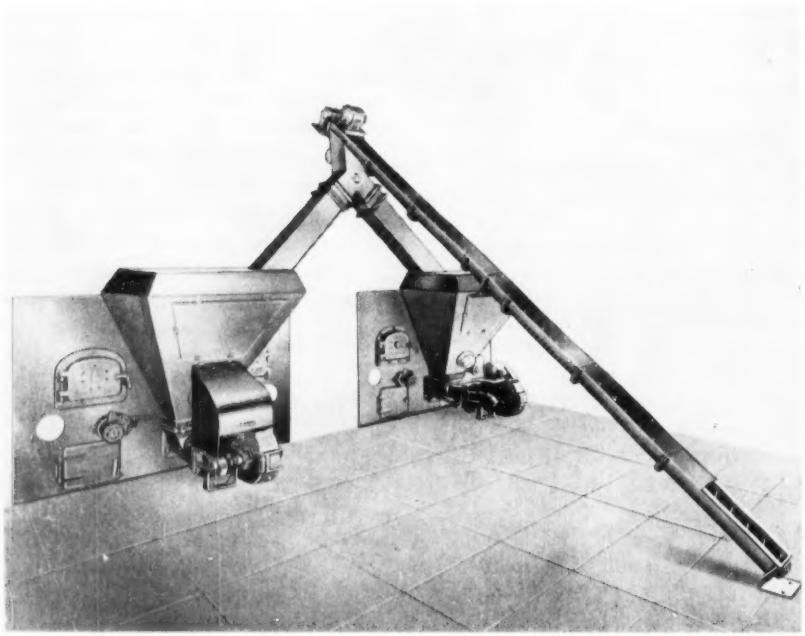
Taking over Krider's former position as sales representative in Canada and the U. S. is John Tuntas, who has had 12 years experience in the heavy construction field. Tuntas, who joined LeTourneau in 1949, has been in the Parts Coordinating Department as a Parts Representative for the past year.

JOHN TUNTAS

John Sharda, who has been in the sales field for the past 10 years and most recently has been serving LeTourneau as a Sales Engineer in the Tournarope Department, has been appointed District Sales Representative for Iowa, Illinois and Indiana.

JOHN SHERDA

He succeeds R. E. Dickerson, who held this position since 1948. Dickerson is joining LeTourneau Distributor Illinois Contractors' Equipment Company as manager of the East Peoria, Illinois branch office.



CANTON STOKER SCREW FEED NOW USED FOR COAL AND BULK MATERIALS HANDLING

The screw feed used in coal stokers has been adapted and is proving highly successful as a larger scale automatic conveyor. Called "Flo-Tubes," the cast iron trough is bolted together in sections, capped with steel plates removable for inspection, and inserted in bottom of bin or pile with end left exposed for pick-up. Flo-Tube on an incline fills one hopper directly or two hoppers by a Y chute arrangement at the top end. Horizontally a single Flo-Tube using gate valves will feed two, three or a battery of hoppers. High and low levels in hoppers are maintained by "off-on" switches automatically starting and stopping the screw feed.

Range of sizes offered convey up to 10,000 lbs. of coal per hour. This represents quite a savings in manpower, for shoveling can be eliminated almost completely if bin bottom is slanted to feed exposed entry end of Flo-Tube by gravity. Noteworthy is reduction in personnel turnover where installations are made—as work is made easier and operators have time for more exacting duties.

Apart from coal, much interest is being expressed for handling of bulk materials such as grain, pellets, flakes, seed, chips, and fertilizer.

Manufacturer: Canton Stoker Corporation, Andrew Place S. W., Canton, Ohio.

● The appointment of Jack H. Gill as assistant manager of the Industrial Division in the General Sales Department has been announced at Caterpillar Tractor Co., by H. H. Howard, director of sales.

Gill, known prominently in the engine manufacturing field, has been employed at Caterpillar since 1937 but has twice interrupted his work for the company to serve as an officer in the United States Army. His first tour of duty was in the Ordnance Department during World War II from March 1942 to

December 1945. During that period he was stationed in Washington, D. C., and Detroit where he assisted in the development and design of tank engines.

Last August he returned to Caterpillar after another tour of 22 months, most of which was General Staff duty in Washington, D. C., in connection with the Army's tank production program.

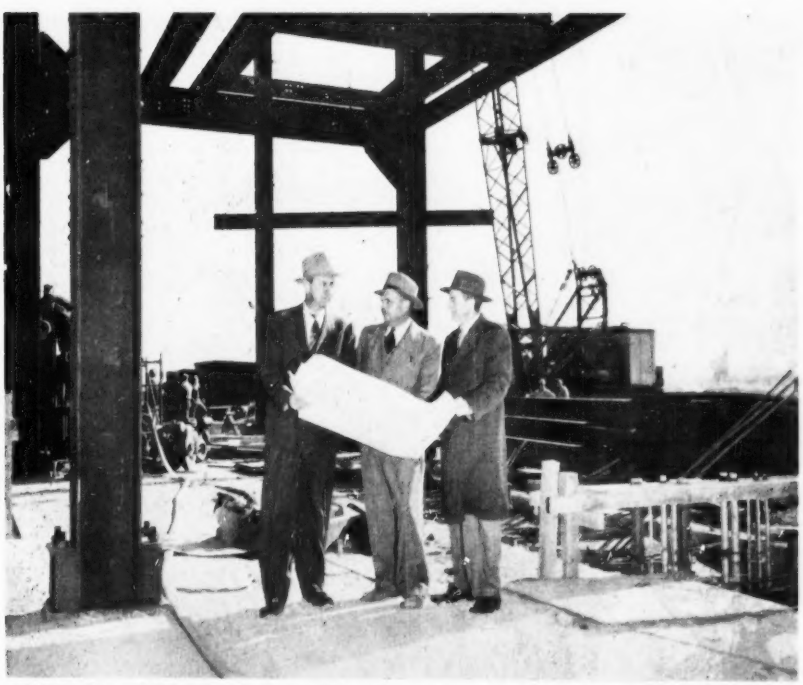
Mr. Gill is a graduate of Texas A. & M. At Caterpillar he has been employed as an engine representative in the Central Sales Division, as a field representative in the engine sales department and, just prior to his most recent appointment, he was an engine sales consultant in the general sale department.

Mr. and Mrs. Gill live at 304 Constantine in Peoria Heights.

● Mr. Oliver C. Henkel, president of Galion Allsteel Body Company of Galion, Ohio, announces the appointment of Ray W. Warren as southeast special representative.

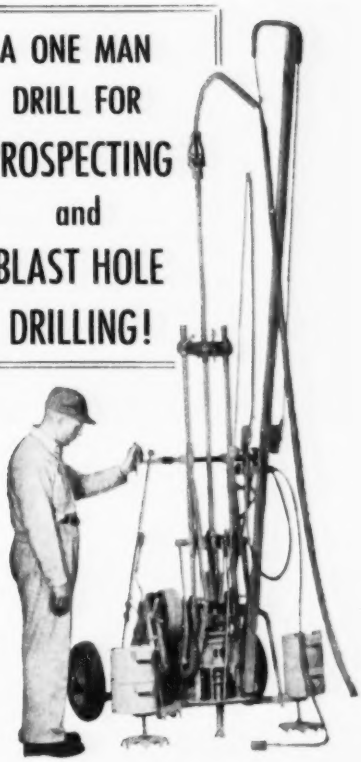
Mr. Warren will direct sales and service of Galion dump bodies, hydraulic hoists and hydraulic tailgates in Virginia, North Carolina, South Carolina, Georgia and Florida. His headquarters will be in Raleigh, North Carolina.

Prior to joining Galion, Mr. Warren was affiliated with A. E. Finley & Associates, Raleigh. He possesses a broad background in the construction equipment and earth moving fields.



York, Pa.—Officials of Caterpillar Tractor Co., Consolidated Engineering Co., and Bethlehem Steel Co. witness first steel erection at Caterpillar's new plant at York. Left to right are: G. C. Schweser, supervising engineer for Caterpillar; J. Edward Pritchett, Consolidated's general superintendent; and K. C. Spayde, Baltimore sales manager for Bethlehem. The Company hopes to begin limited production of replacement parts in May, 1953.

A ONE MAN DRILL FOR PROSPECTING and BLAST HOLE DRILLING!



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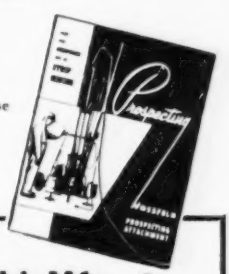

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● The new double ended, model 1-29 throw-away type mining machine bit recently placed on the market by The Bowdil Company of Canton, Ohio. This patented shape

bit with wider cutting face maintains sharpness because of the unique concave body design. The new Bowdil bit is made of alloy steel, heat treated to best suit the requirements of the customer.

● A new hydraulic end-loader for all makes of motor trucks is announced by The Galion Allsteel Body Company, Galion, Ohio.

Known as the Galion Hydraulic "LOAD-evator," the unit is available in 4 models with loading space of 28 x 84 inches to 34 x 90 inches. Models are adaptable to all trucks of 1½ ton size and over and are suitable for the use of virtually every type of business and industry. "LOAD-evators" have a load capacity of 2,000 pounds.

Among the "LOAD-evator" advantages, listed by the manufacturer, are a 50% reduction in delivery time on heavy or bulky articles, elimination of the need for costly loading docks, reduction of damage to goods and a lessening of driver fatigue to an important degree. Extensive tests also indicate that, by using "LOAD-evators," the average truck operator can do more work with fewer vehicles and reduced personnel, the manufacturer states.

Power for "LOAD-evator" operation is supplied direct from the truck engine through a transmis-

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A retail coal merchant—J. Rose, South Bend, Ind.—talks with M. L. Patton, vice president, Truax-Traer Coal Co., and R. L. Ireland, chairman, Executive Committee of Pittsburgh Consolidation Coal Co., during the National Coal Association convention at The Waldorf-Astoria, New York, Nov. 11, 1952.

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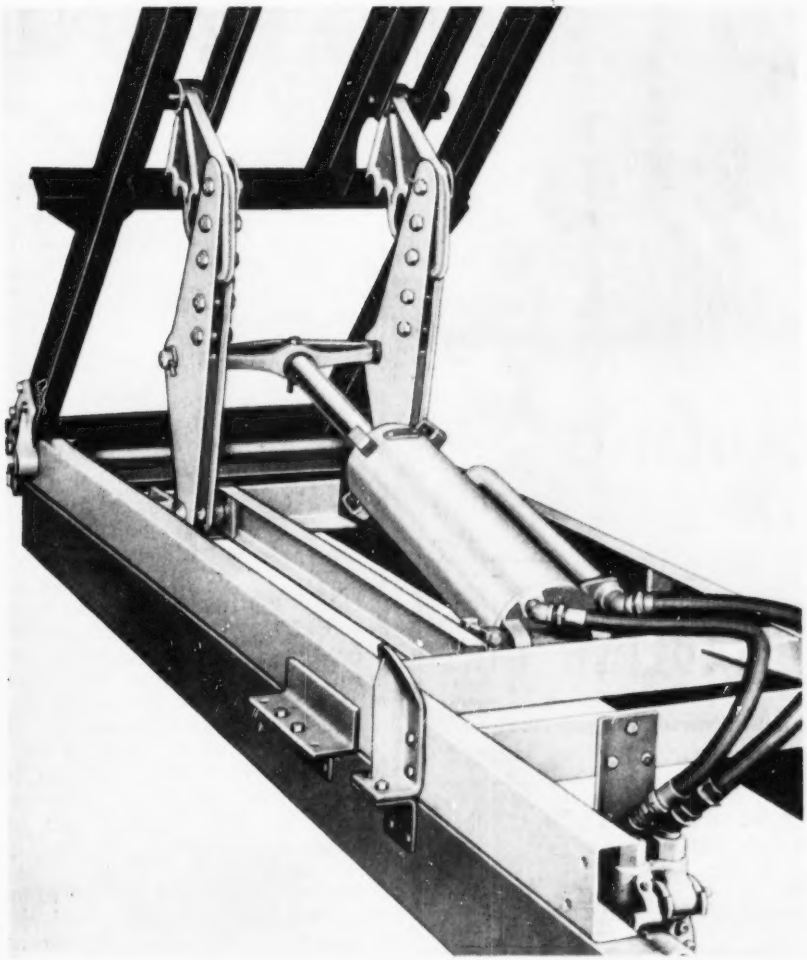
sion-mounted power take-off. The latter activates a Galion hydraulic hoist which lifts or lowers the end gate as desired. The "LOAD-evator" action is controlled by a single spring-loaded lever which assures constant, positive, safe operation. Heavy tubular lift arms with built in overload capacity are another important safety factor.

In addition to standard models, "LOAD-evators" are furnished with a number of special accessories for various industries.

These include side loading ramps, support racks for gas and air cylinder deliveries, racks for double-decking, etc. Full details may be secured from any Galion distributor, or write for Bulletin 652-L. The Galion Allsteel Body Company, Galion, Ohio.



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● A new solvent that cleans electric motors and generators while they are still assembled has been announced by The Shaler Company, Waupun, Wisconsin. This new product, called Shaler Generator-Motor Cleaner, is listed under the Reexaminaton Service of Underwriters' Laboratories, Inc.

According to the company, motors and generators can be cleaned two different ways, with this solution:

(1) A motor can be completely submerged in Shaler Generator-Motor Cleaner, then plugged into electric current and allowed to run for from three to five minutes. The motor is then removed from the dip tank and dried with compressed air.

(2) Shaler Generator - Motor

Cleaner may be sprayed into the intake side of a motor, while it is in operation.

Motors which have ben accidentally submerged in water as a result of fires, flood, etc., may be cleaned without "baking."

Shaler Generator-Motor Cleaner does not affect wiring or insulation which is gasoline- or oil-resistant.

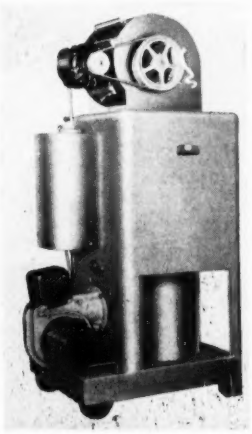
Shaler officials point out that this new product has been used in the Shaler plant with very satisfactory results for more than a year. The company has about 300 motors, and the plant superintendent has a periodic motor-cleaning schedule which involves cleaning twenty motors each week, to keep them at peak operating efficiency. The use of Shaler Generator-Motor Cleaner has materially reduced the time and expense formerly required for this cleaning operation.

Further information on Shaler Generator-Motor Cleaner can be obtained by writing The Shaler Company, Waupun, Wisconsin.

● Addition to the Fageol Heat Machine line of a new 168,000 B.t.u. unit with an adjustable vent for permanent installation or portable on-the-job use, it announced by the Fageol Heat Machine Company, Detroit.

Known as the Fageol Model VO-168, the new machine operates on the exclusive Fageol counterflow principle of spraying heated air out across foor areas to form a 6-foot-high banket of warmth in the work zone. According to the manufacturer, this principle of heating from the floor up avoids wasting heat in unused, overhead areas. Fageol Heat Machines are said to heat men at work, not empty spaces.

When used with a flue and vented outside, Model VO-168 is recommended for permanent use in confined areas such as small plants, garages, offices, warehouses, gas stations, foundries, barns, stores, barracks, trailers. Heat output vented is 130,000 B.t.u. per hour. When used without a flue, free heat is directed back into the blower and discharged "superheated," increasing output to 168,000 B.t.u. per hour. Unvented, the new Fageol Heat Machine is recommended for on-the-job use in construction work, in large drafty buildings, on loading docks. Equipped with wheels for easy portability, it can also be used for deicing wheels and transmissions, drying plaster, paint and concrete, curing tobacco, drying fabrics and rugs, drying corn, hay, beans and other agricultural products.



Model VO-168 operates from a detached fuel supply, burning No. 1 or No. 2 fuel oil, kerosene or diesel oil. A 10-gallon fuel tank may be attached to the unit as optional equipment. Dimensions of the machine are 21" x 33" x 69". Weight is 345 pounds. Burner is UL-approved gun type, pressure atomizing. The machine can be started or stopped by simply snapping a switch.

Write for bulletin L-5391, Fageol Heat Machine Company, 5725 Mt. Elliott Ave., Detroit 11, Michigan.

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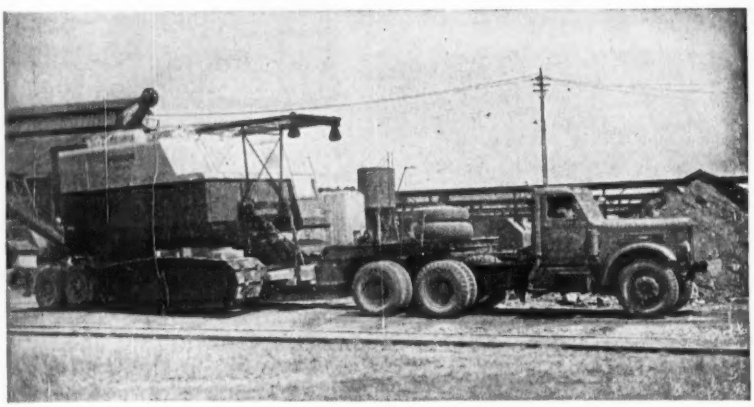

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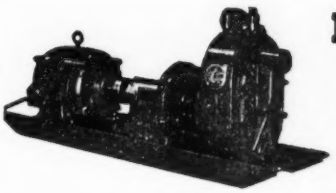

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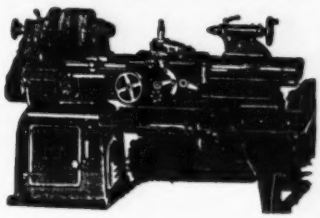

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GMC 75 Kw Deisel Generator—with automatic control.

11 BU Joy 250-V, DC. Good condition.

Joy 7 SC Cable type shuttle car. A-1 condition.

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Goodman Shortwalls and 512 Trucks. Bargain. Excellent condition.

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1—Brownie HKL Spot Hoist—1948 model.

6—Mine Haulage Hoists—various sizes, complete with motors, starters.

2—G. E. 10 Ton Tandem Locos—42 in. gage, excellent condition. Price open.

800 amp. ITE-KSA Automatic Circuit Breaker—275-V with reverse current relay.

GE 1200 amp 500-V Automatic Circuit Breaker.

100 KW MG set syn. 250-V. Complete panels and switch gear.

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4500 Manitowoc Dragline, 120' boom, 5 yd. Page bucket, Cummins supercharged diesel engine with torque converter. Excellent condition.

1201 Lima Dragline, with 85' boom, 2 - 3 yd. Page bucket, 18'11" x 44" crawlers, Cummins diesel engine. Very good condition.

3500 Manitowoc Combination, with 80' boom, 2½ yd. Page bucket; 35' shovel boom, 27' stick and 2½ yd. dipper; Buda diesel engine. Machine in very fine condition.

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38-B Bucyrus-Erie Combination Shovel and Dragline, with 60' drag boom, 1½ yd. bucket; 1½ yd. shovel front; D-13000 Cat. engine.

Model 331 Marion ¾ yd. Shovel, with D-318 Cat. diesel engine; vacuum trip, chain crowd. About 3 yrs. old.

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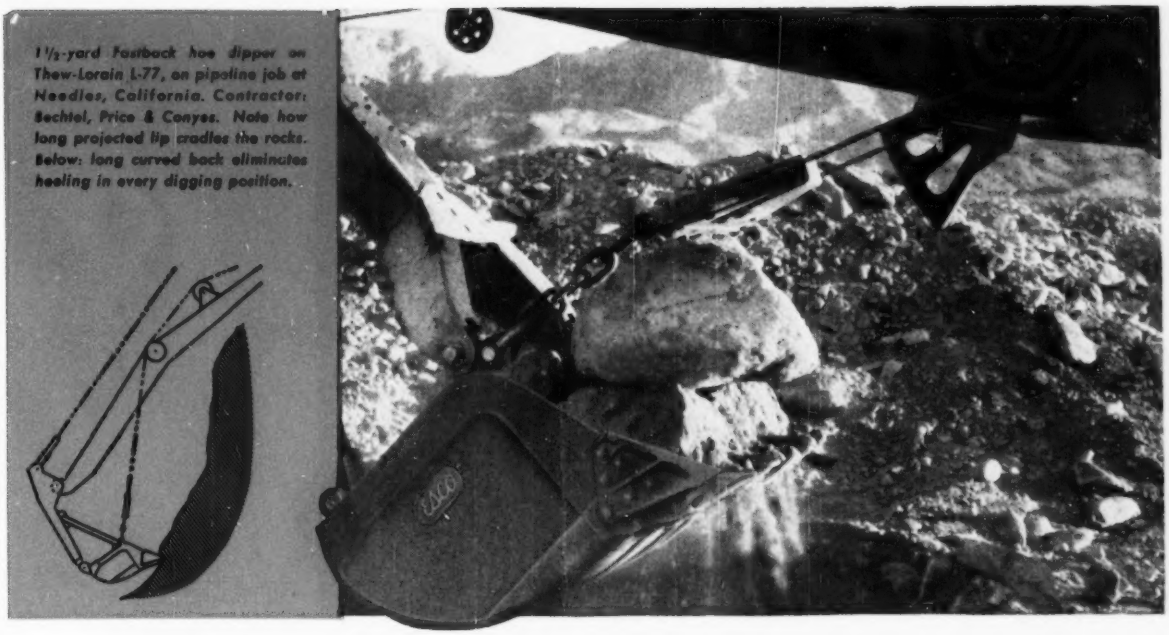

1½-yard Fastback hoe dipper on Thew-Lorain L-77, on pipeline job at Needles, California. Contractor: Bechtel, Price & Conyes. Note how long projected lip cradles the rocks. Below: long curved back eliminates heeling in every digging position.

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...in sizes to Suit Your Machines

that's ESCO FASTBACK the non-heeling hoe dipper

With an *ESCO* FASTBACK mounted on your dipper sticks, you have an unbeatable combination for producing low cost yardage with your present machines. You can

Make wide cuts with small machines.

Get full capacities from large machines on narrow cuts.

Dig a deeper trench (as much as two feet deeper with some machines).

ESCO Fastback is made in sizes from ⅜ yard to 2½ yards —*and in 7 different basic widths.* Six different sets of interchangeable side cutters are available for each of these seven units, and through their use *each basic unit may be further varied to produce 37 combinations of cutting widths.* Side teeth also are furnished on request.

Require Little Maintenance on Tough Jobs

Based upon construction principles proven through the years by *ESCO* dipper and dragline bucket performance, the Fastback hoe dipper is built to take the punishment of hard work.

Cast alloy steel lip with integral cast tooth holders takes the shock and abrasion of digging. Alloy steel side cutters and teeth are properly mounted for efficient digging. Top and bottom corners are reinforced with alloy steel castings. Cast steel stick connections have manganese steel bushings.

For details of sizes and dimensions, see your nearest *ESCO* representative, or write for specification sheet 177.

ESCO

Dippers, Hoe Dippers, Dragline and Coal Loading Buckets

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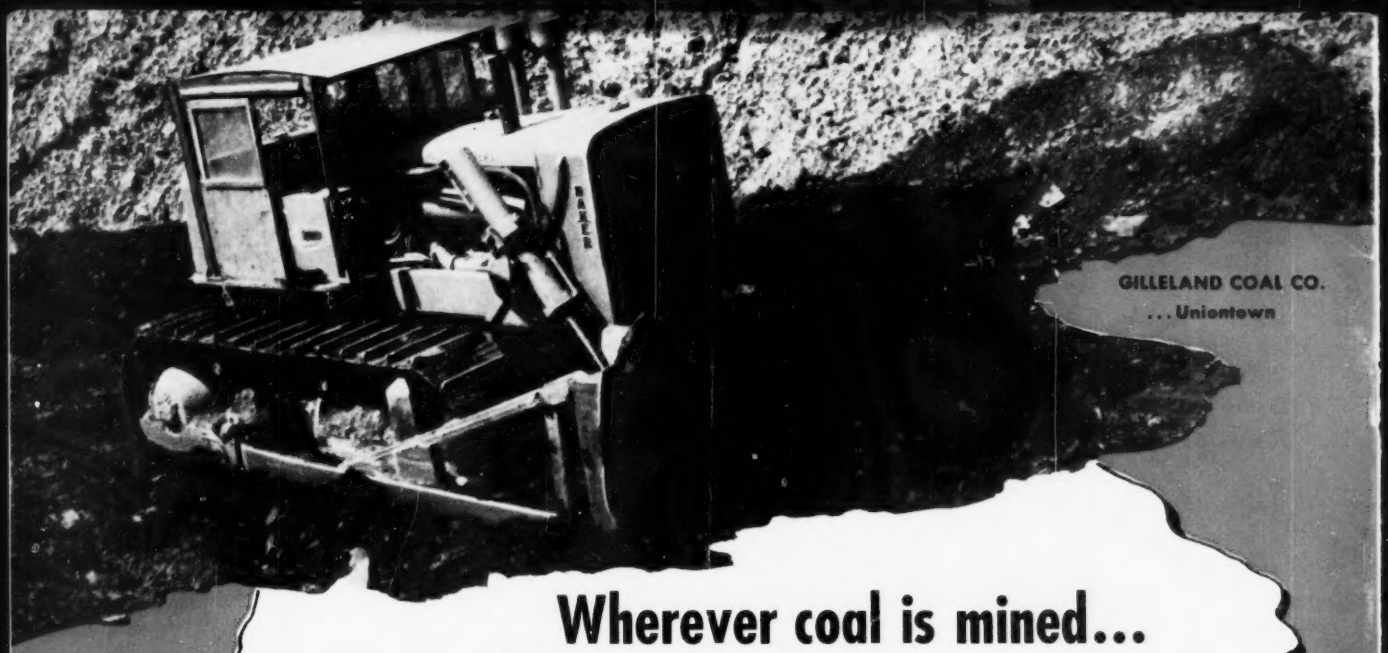

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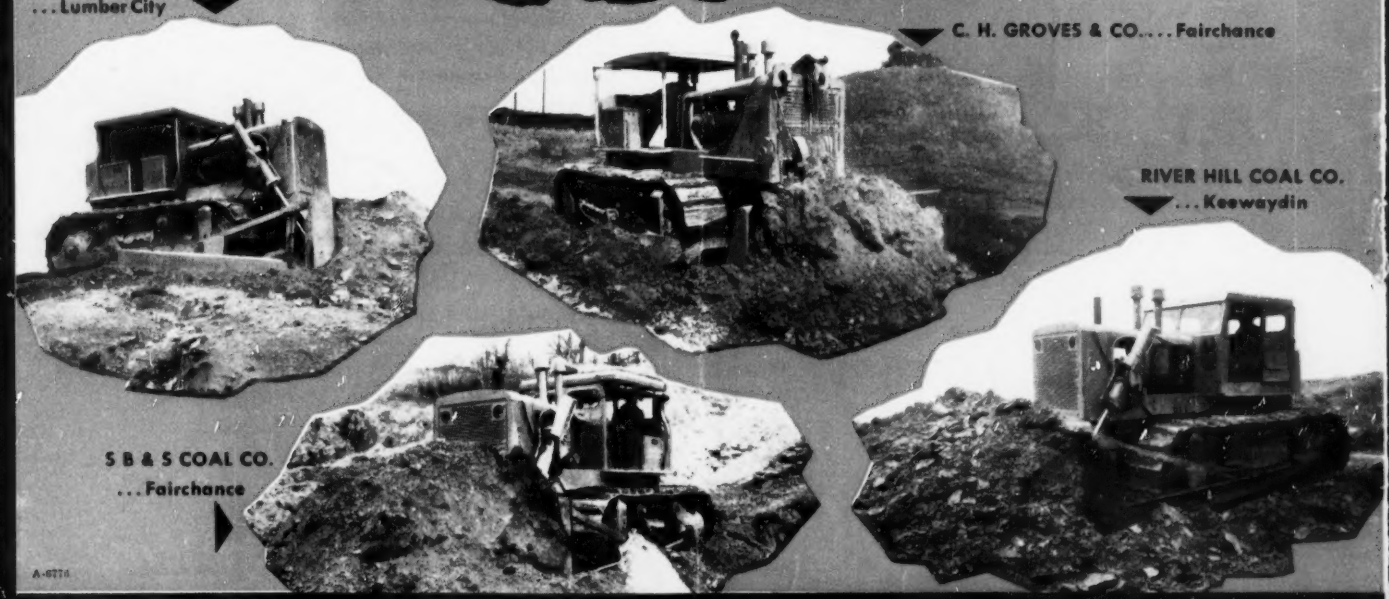

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